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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/812,861	03/30/2004	Thomas Hubert Van Steenkiste	DP-308959	3460

7590 03/20/2006

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EXAMINER	
BAREFORD, KATHERINE A	
ART UNIT	PAPER NUMBER
1762	

DATE MAILED: 03/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/812,861	VAN STEENKISTE ET AL.	
	Examiner	Art Unit	
	Katherine A. Bareford	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 February 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9,11-18 and 20-26* is/are rejected.

7)☒ Claim(s) *27* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. *attached*.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

The amendment of February 9, 2006 has been received and entered.

With the amendment, claims 10 and 19 are canceled, and claims 1-9, 11-18 and 20-27 are now present for examination.

Priority

1. Applicant's claim for domestic priority under 35 U.S.C. 119(e) is acknowledged. However, the provisional application upon which priority is claimed fails to provide adequate support under 35 U.S.C. 112 for claims 1-9, 11-18 and 20-27 of this application.

The provisional application does not indicate (1) that the mask is pressed against the plastic type material as required by claim 1, part d) and (2) that the particle size can be 250 to 1400 microns as required by claim 12. Therefore, as to claims 1-9, 11-18 and 20-27, priority only extends to the filing date of the U.S. application, March 30, 2004.

Claims

2. The Examiner notes that claim 1, part f) and claim 12, part e) now require the "kinetic spraying of the particles". The Examiner understands by "kinetic spraying" that applicant means that a kinetic spray process as described in paragraph [0004] of the specification is performed, whereby the particles are accelerated to a velocity sufficient to adhere to the substrate but do not melt or thermally soften prior to impingement on the substrate. If applicant disagrees, he should so indicate on the record.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-4, 6, 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rayburn (US 3731354) in view of Tawfik et al (US 2004/0101738), Van Steenkiste et al (US 6283386) (hereinafter Van Steenkiste '386) and Hathaway (US 2599710).

Rayburn teaches a method of spray coating a substrate covered by a plastic type material. Column 1, lines 50-60. Rayburn teaches making a rolled capacitor made from a two side metallized plastic dielectic material with thin coating of plastic material applied to head of the metallized layers for holding the capacitor together. Column 1, lines 50-60. After the capacitor is rolled, the plastic covered ends are sprayed with a high velocity spray of molten metal, preferably aluminum, which embeds itself in the plastic coatings between the metallized layers so as to contact the surface as well as the

ends of the electrodes, but does not substantially penetrate the dielectric strip substrate. Column 1, line 65 through column 2, line 10, column 7, line 65 through column 6, line 20 and figure 7. The metal spraying must be done at high velocity. Column 6, lines 5-10. This embedding in the plastic to the metal below would "remove" the plastic, as it would be, at the least, pushed out of the way of the metal in the area of application.

Claim 2: the particles can be aluminum. Column 6, lines 1-25.

Claim 3: the substrate can comprise electrical conductor material. Column 4, lines 40-60 (layers 14, 16).

Claim 4: the substrate can be a flexible electrical circuit. See column 5, lines 25-30 showing the flexibility of composite film 10.

Rayburn teaches all the features of these claims except (1) the kinetic spraying and its features and (2) the mask and its features.

However, Tawfik teaches that when spraying metal particles into a substrate to be embedded, it is desirable to use either thermal spraying or cold gas dynamic spraying (=kinetic spraying). See paragraphs [0014], [0016], [0022], [0043] and [0049]. The use of cold gas dynamic spraying prevents problems from overheating during coating from occurring. Paragraphs [0022] and [0049].

Van Steenkiste '386 notes that kinetic spraying and cold gas dynamic spraying are equivalent. Column1, lines 15-25. Van Steenkiste '386 also provides a desirable method of kinetic spraying of metals. Column 1, lines 55-60. Particle sizes can be in excess of 100 microns, up to 106 microns. Column 2, lines 20-30 and column 5, lines 45-

55. For spraying a supersonic nozzle having a converging region connected to a diverging region through a throat is provided. Figure 2 and column 3, lines 40-65. A flow of heated main gas is directed through the nozzle. Column 3, lines 30-40. The particles are entrained in the flow of the heated main gas and accelerated to a velocity sufficient to result in the particles impacting and adhering to the substrate. Column 1, line 55 through column 2, line 10. The particles can be aluminum. Column 5, lines 25-30. The velocity can be greater than 1000 m/s. Column 1, lines 60-68. The gas temperature can be 650 degrees C. Column 1, lines 60-68.

Hathaway teaches that when coating a substrate with sprayed metal, such as when making electrical wiring, it is known to apply a mask to both sides of the substrate to provide a pattern to be sprayed. See column 3, lines 40-70 and column 4, lines 10-25.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Rayburn to use kinetic spraying as suggested by Tawfik in order to desirably embed particles in the plastic layer without overheating the substrate, because Rayburn teaches thermally spraying metal particles to be embedded in a plastic layer on a substrate, and Tawfik teaches that when spraying metal particles to be embedded, it is desirable to use kinetic spraying to replace thermal spraying in order to prevent overheating of the substrate. It would further have been obvious to modify Rayburn in view of Tawfik to use the kinetic spraying features taught by Van Steenkiste '386 with an expectation of providing a desirably kinetic sprayed coating,

because Rayburn in view of Tawfik suggests using kinetic spraying to provide the sprayed metal and Van Steenkiste '386 provides a desirable form of kinetic spraying to apply metal particles. It would further have been obvious to modify Rayburn in view of Tawfik and Van Steenkiste '386 to use the mask as suggested by Hathaway in order to provide coating to the specifically desired areas, because Rayburn in view of Tawfik and Van Steenkiste '386 teach applying a sprayed metal to a substrate and Hathaway teaches that when applying sprayed metal to a substrate, it is desirable to use an applied mask when a specific area is desirable to be sprayed.

6. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rayburn in view of Tawfik , Van Steenkiste '386 and Hathaway as applied to claims 1-4, 6, 9 and 11 above, and further in view of Martyniak (US 4263341).

Rayburn in view of Tawfik , Van Steenkiste '386 and Hathaway teach all the features of this claim except the material of the mask.

However, Martyniak teaches that it is well known to use a mask of stainless steel, for example, when applying a sprayed metal coating to a substrate. Column 5, lines 5-50.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Rayburn in view of Tawfik , Van Steenkiste '386 and Hathaway to use a stainless steel mask as suggested by Martyniak with an expectation of providing a desirable mask for coating because Rayburn in view of Tawfik , Van

Steenkiste '386 and Hathaway suggest using a mask when metal spray coating and Marytniak teaches that a desirable mask for metal spray coating is made from stainless steel.

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rayburn in view of Tawfik , Van Steenkiste '386 and Hathaway as applied to claims 1-4, 6, 9 and 11 above, and further in view of Kashirin et al (US 6402050).

Rayburn in view of Tawfik , Van Steenkiste '386 and Hathaway teach all the features of this claim except entering the particles in the flow of gas at a point in the diverging region.

However, Kashirin teaches that in the art of cold gas dynamic spraying (kinetic spraying) it is desirable to provide the particles into the flow of gas at a point in the diverging region in order to reduce wear on the nozzle. Column 3, lines 1-25 and column 2, lines 1-20 and figure 1.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Rayburn in view of Tawfik , Van Steenkiste '386 and Hathaway to feed the particles into the diverging region as suggested by Kashirin with an expectation of providing a desirably less worn spray system because Rayburn in view of Tawfik , Van Steenkiste '386 and Hathaway suggest using a kinetic spraying process and Kashirin teaches when kinetic spraying it is desirable to provide the powder in the diverging region to prevent wear on the nozzle.

8. Claims 5 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rayburn in view of Tawfik , Van Steenkiste '386 and Hathaway as applied to claims 1-4, 6, 9 and 11 above, and further in view of McCane et al (US 6592947).

Rayburn in view of Tawfik , Van Steenkiste '386 and Hathaway teach all the features of these claims except (1) the nozzle stand off distance (claim 5) and (2) the traverse speed (claim 23).

McCane teaches that when performing kinetic spraying, it is known that the thickness of the layer to be applied can be controlled by adjusting the gun traverse speed. Column 5, lines 10-20, column 3, lines 5-35 and column 4, lines 5-20. McCane also teaches that based on the material to be applied there is a critical velocity for application that is partly based on the nozzle standoff distance from the substrate surface. Column 3, lines 20-35.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Rayburn in view of Tawfik , Van Steenkiste '386 and Hathaway to optimize the distance between the substrate and nozzle and the traverse speed when performing the process of Rayburn in view of Tawfik and Van Steenkiste '386 and Hathaway as suggested by McCane, because Van Steenkiste '386 provides spraying features for various sizes of particles and materials and McCane teaches that traverse speed in kinetic spraying can be adjusted to provide for a desirable coating thickness and nozzle standoff distance from the substrate should be based on the

material to be sprayed, and one would perform routine experimentation to optimize the positioning and speeds for the specific materials and purposes used.

9. Claims 12-15, 18, 20 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rayburn (US 3731354) in view of Tawfik et al (US 2004/0101738) and Van Steenkiste (US 6623796) (hereinafter Van Steenkiste '796).

Rayburn teaches a method of spray coating a substrate covered by a plastic type material. Column 1, lines 50-60. Rayburn teaches making a rolled capacitor made from a two side metallized plastic dielectic material with thin coating of plastic material applied to head of the metallized layers for holding the capacitor together. Column 1, lines 50-60. After the capacitor is rolled, the plastic covered ends are sprayed with a high velocity spray of molten metal, preferably aluminum, which embeds itself in the plastic coatings between the metallized layers so as to contact the surface as well as the ends of the electrodes, but does not substantially penetrate the dielectric strip substrate. Column 1, line 65 through column 2, line 10, column 7, line 65 through column 6, line 20 and figure 7. The metal spraying must be done at high velocity. Column 6, lines 5-10. This embedding in the plastic to the metal below would "remove" the plastic, as it would be, at the least, pushed out of the way of the metal in the area of application.

Claim 13: the particles can be aluminum. Column 6, lines 1-25.

Claim 14: the substrate can comprise electrical conductor material. Column 4, lines 40-60 (layers 14, 16).

Claim 15: the substrate can be a flexible electrical circuit. See column 5, lines 25-30 showing the flexibility of composite film 10.

Rayburn teaches all the features of these claims except the kinetic spraying and its features.

However, Tawfik teaches that when spraying metal particles into a substrate to be embedded, it is desirable to use either thermal spraying or cold gas dynamic spraying (=kinetic spraying). See paragraphs [0014], [0016], [0022], [0043] and [0049]. The use of cold gas dynamic spraying prevents problems from overheating during coating from occurring. Paragraphs [0022] and [0049].

Van Steenkiste '796 notes that kinetic spraying and cold gas dynamic spraying are equivalent. Column 1, lines 20-30. Van Steenkiste '796 also provides a desirable method of kinetic spraying of metals. Column 2, lines 40-55. Particle sizes can be 250 microns in diameter..Column 2, lines 40-55. For spraying a supersonic nozzle having a converging region connected to a diverging region through a throat is provided. Figure 2 and column 3, line 45 through column 4, line 10. A flow of heated main gas is directed through the nozzle. Column 3, lines 40-55. The particles are entrained in the flow of the heated main gas and accelerated to a velocity sufficient to result in the particles impacting and adhering to the substrate. Column 2, lines 40-55. The particles can be metal. Column 4, lines 50-60. The velocity can be 300-1200 m/s. Column 5, lines 30-40. The gas temperature can be 1200 degrees F. Column 5, lines 50-55.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Rayburn to use kinetic spraying as suggested by Tawfik in order to desirably embed particles in the plastic layer without overheating the substrate, because Rayburn teaches thermally spraying metal particles to be embedded in a plastic layer on a substrate, and Tawfik teaches that when spraying metal particles to be embedded, it is desirable to use kinetic spraying to replace thermal spraying in order to prevent overheating of the substrate. It would further have been obvious to modify Rayburn in view of Tawfik to use the kinetic spraying features taught by Van Steenkiste '796 with an expectation of providing a desirably kinetic sprayed coating, because Rayburn in view of Tawfik suggests using kinetic spraying to provide the sprayed metal and Van Steenkiste '796 provides a desirable form of kinetic spraying to apply metal particles. It further would have been a matter of design choice to kinetic spray the particles in a single pass as required by claim 26 or in multiple passes, as kinetic spraying works to build up particles by impact on a substrate at a relatively low temperature that would not damage the substrate.

10. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rayburn in view of Tawfik and Van Steenkiste '796 as applied to claims 12-~~14~~ 15, 18, 20 and 26 above, and further in view of Kashirin et al (US 6402050).

Rayburn in view of Tawfik and Van Steenkiste '796 teach all the features of this claim except entering the particles in the flow of gas at a point in the diverging region.

However, Kashirin teaches that in the art of cold gas dynamic spraying (kinetic spraying) it is desirable to provide the particles into the flow of gas at a point in the diverging region in order to reduce wear on the nozzle. Column 3, lines 1-25 and column 2, lines 1-20 and figure 1.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Rayburn in view of Tawfik and Van Steenkiste '796 to feed the particles into the diverging region as suggested by Kashirin with an expectation of providing a desirably less worn spray system because Rayburn in view of Tawfik and Van Steenkiste '796 suggest using a kinetic spraying process and Kashirin teaches when kinetic spraying it is desirable to provide the powder in the diverging region to prevent wear on the nozzle.

11. Claims 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rayburn in view of Tawfik and Van Steenkiste '796 as applied to claims 12-15, 18, 20 and 26 above, and further in view of Martyniak (US 4263341).

Rayburn in view of Tawfik and Van Steenkiste '796 teach all the features of these claims except the mask.

However, Martyniak teaches that it is well known to use a mask of stainless steel, for example, when applying a sprayed metal coating to a substrate to provide coating in a desired area. Column 5, lines 5-50.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Rayburn in view of Tawfik and Van Steenkiste '796 to use a stainless steel mask as suggested by Martyniak with an expectation of providing coating to specifically desired areas because Rayburn in view of Tawfik and Van Steenkiste '796 suggest applying a sprayed metal to a substrate and Marytniak teaches that when applying a sprayed metal to a substrate it is desirable to use an applied mask when specific areas are to be sprayed and that a desirable mask for metal spray coating is made from stainless steel.

12. Claims 16, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rayburn in view of Tawfik and Van Steenkiste '796 as applied to claims 12-15, 18, 20 and 26 above, and further in view of McCane et al (US 6592947).

Rayburn in view of Tawfik and Van Steenkiste '796 teach all the features of these claims except the stand off distance of the nozzle (claim 16) and the traverse speed (claim 24).

McCane teaches that when performing kinetic spraying, it is known that the thickness of the layer to be applied can be controlled by adjusting the gun traverse speed. Column 5, lines 10-20, column 3, lines 5-35 and column 4, lines 5-20. McCane also teaches that based on the material to be applied there is a critical velocity for application that is partly based on the nozzle standoff distance from the substrate surface. Column 3, lines 20-35.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Rayburn in view of Tawfik and Van Steenkiste '796 to optimize the distance between the substrate and nozzle and the traverse speed when performing the process of Rayburn in view of Tawfik and Van Steenkiste '796 as suggested by McCane, because Van Steenkiste '796 provides spraying features for various sizes of particles and materials and McCane teaches that traverse speed in kinetic spraying can be adjusted to provide for a desirable coating thickness and nozzle standoff distance from the substrate should be based on the material to be sprayed, and one would perform routine experimentation to optimize the positioning and speeds for the specific materials and purposes used.

13. Claims 1-4, 6, 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rayburn (US 3731354) in view of Tawfik et al (US 2004/0101738), Van Steenkiste (US 6623796) (hereinafter Van Steenkiste '796) and Hathaway (US 2599710).

Rayburn teaches a method of spray coating a substrate covered by a plastic type material. Column 1, lines 50-60. Rayburn teaches making a rolled capacitor made from a two side metallized plastic dielectic material with thin coating of plastic material applied to head of the metallized layers for holding the capacitor together. Column 1, lines 50-60. After the capacitor is rolled, the plastic covered ends are sprayed with a high velocity spray of molten metal, preferably aluminum, which embeds itself in the plastic coatings between the metallized layers so as to contact the surface as well as the

ends of the electrodes, but does not substantially penetrate the dielectric strip substrate. Column 1, line 65 through column 2, line 10, column 7, line 65 through column 6, line 20 and figure 7. The metal spraying must be done at high velocity. Column 6, lines 5-10. This embedding in the plastic to the metal below would "remove" the plastic, as it would be, at the least, pushed out of the way of the metal in the area of application.

Claim 13: the particles can be aluminum. Column 6, lines 1-25.

Claim 14: the substrate can comprise electrical conductor material. Column 4, lines 40-60 (layers 14, 16).

Claim 15: the substrate can be a flexible electrical circuit. See column 5, lines 25-30 showing the flexibility of composite film 10.

Rayburn teaches all the features of these claims except the kinetic spraying and its features.

However, Tawfik teaches that when spraying metal particles into a substrate to be embedded, it is desirable to use either thermal spraying or cold gas dynamic spraying (=kinetic spraying). See paragraphs [0014], [0016], [0022], [0043] and [0049]. The use of cold gas dynamic spraying prevents problems from overheating during coating from occurring. Paragraphs [0022] and [0049].

Van Steenkiste '796 notes that kinetic spraying and cold gas dynamic spraying are equivalent. Column 1, lines 20-30. Van Steenkiste '796 also provides a desirable method of kinetic spraying of metals. Column 2, lines 40-55. Particle sizes can be 250 microns in diameter or less. Column 2, lines 40-55. For spraying a supersonic nozzle

having a converging region connected to a diverging region through a throat is provided. Figure 2 and column 3, line 45 through column 4, line 10. A flow of heated main gas is directed through the nozzle. Column 3, lines 40-55. The particles are entrained in the flow of the heated main gas and accelerated to a velocity sufficient to result in the particles impacting and adhering to the substrate. Column 2, lines 40-55. The particles can be metal. Column 4, lines 50-60. The velocity can be 300-1200 m/s. Column 5, lines 30-40. The gas temperature can be 1200 degrees F. Column 5, lines 50-55.

Hathaway teaches that when coating a substrate with sprayed metal, such as when making electrical wiring, it is known to apply a mask to both sides of the substrate to provide a pattern to be sprayed. See column 3, lines 40-70 and column 4, lines 10-25.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Rayburn to use kinetic spraying as suggested by Tawfik in order to desirably embed particles in the plastic layer without overheating the substrate, because Rayburn teaches thermally spraying metal particles to be embedded in a plastic layer on a substrate, and Tawfik teaches that when spraying metal particles to be embedded, it is desirable to use kinetic spraying to replace thermal spraying in order to prevent overheating of the substrate. It would further have been obvious to modify Rayburn in view of Tawfik to use the kinetic spraying features taught by Van Steenkiste '796 with an expectation of providing a desirably kinetic sprayed coating,

because Rayburn in view of Tawfik suggests using kinetic spraying to provide the sprayed metal and Van Steenkiste '796 provides a desirable form of kinetic spraying to apply metal particles. It would further have been obvious to modify Rayburn in view of Tawfik and Van Steenkiste '796 to use the mask as suggested by Hathaway in order to provide coating to the specifically desired areas, because Rayburn in view of Tawfik and Van Steenkiste '386 teach applying a sprayed metal to a substrate and Hathaway teaches that when applying sprayed metal to a substrate, it is desirable to use an applied mask when a specific area is desirable to be sprayed.

14. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rayburn in view of Tawfik , Van Steenkiste '796 and Hathaway as applied to claims 1-4, 6, 9 and 11 above, and further in view of Kashirin et al (US 6402050).

Rayburn in view of Tawfik, Van Steenkiste '796 and Hathaway teach all the features of this claim except entering the particles in the flow of gas at a point in the diverging region.

However, Kashirin teaches that in the art of cold gas dynamic spraying (kinetic spraying) it is desirable to provide the particles into the flow of gas at a point in the diverging region in order to reduce wear on the nozzle. Column 3, lines 1-25 and column 2, lines 1-20 and figure 1.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Rayburn in view of Tawfik, Van Steenkiste '796 and

Hathaway to feed the particles into the diverging region as suggested by Kashirin with an expectation of providing a desirably less worn spray system because Rayburn in view of Tawfik, Van Steenkiste '796 and Hathaway suggest using a kinetic spraying process and Kashirin teaches when kinetic spraying it is desirable to provide the powder in the diverging region to prevent wear on the nozzle.

15. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rayburn in view of Tawfik, Van Steenkiste '796 and Hathaway as applied to claims 1-4, 6, 9 and 11 above, and further in view of Martyniak (US 4263341).

Rayburn in view of Tawfik, Van Steenkiste '796 and Hathaway teach all the features of these claims except the material of the mask.

However, Martyniak teaches that it is well known to use a mask of stainless steel, for example, when applying a sprayed metal coating to a substrate to provide coating in a desired area. Column 5, lines 5-50.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Rayburn in view of Tawfik ,Van Steenkiste '796 and Hathaway to use a stainless steel mask as suggested by Martyniak with an expectation of providing a desirable mask for coating, because Rayburn in view of Tawfik ,Van Steenkiste '796 and Hathaway suggest applying a sprayed metal to a substrate using a mask and Marytniak teaches a desirable mask for metal spray coating is made from stainless steel.

16. Claims 5 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rayburn in view of Tawfik , Van Steenkiste '796 and Hathaway as applied to claims 1-4, 6, 9 and 11 above, and further in view of McCane et al (US 6592947).

Rayburn in view of Tawfik , Van Steenkiste '796 and Hathaway teach all the features of these claims except (1) the nozzle stand off distance (claim 5) and (2) the traverse speed (claim 23).

McCane teaches that when performing kinetic spraying, it is known that the thickness of the layer to be applied can be controlled by adjusting the gun traverse speed. Column 5, lines 10-20, column 3, lines 5-35 and column 4, lines 5-20. McCane also teaches that based on the material to be applied there is a critical velocity for application that is partly based on the nozzle standoff distance from the substrate surface. Column 3, lines 20-35.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Rayburn in view of Tawfik , Van Steenkiste '796 and Hathaway to optimize the distance between the substrate and nozzle and the traverse speed when performing the process of Rayburn in view of Tawfik, Van Steenkiste '386 and Hathaway as suggested by McCane, because Van Steenkiste '796 provides spraying features for various sizes of particles and materials and McCane teaches that traverse speed in kinetic spraying can be adjusted to provide for a desirable coating thickness and nozzle standoff distance from the substrate should be based on the material to be

sprayed, and one would perform routine experimentation to optimize the positioning and speeds for the specific materials and purposes used.

17. Claims 5 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rayburn in view of Tawfik , Van Steenkiste '386 and Hathaway as applied to claims 1-4, 6, 9 and 11 above, and further in view of either (a) Elmoursi et al (US 2003/0219576), (b) Zhao et al (US 2005/0040260) or (c) Van Steenkiste et al (US 2004/0157000) (hereinafter Van Steenkiste '000).

As to rejections using Zhao et al and Van Steenkiste '000 only:The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Rayburn in view of Tawfik , Van Steenkiste '386 and Hathaway teach all the features of these claims except (1) the nozzle stand off distance (claim 5) and (2) the traverse speed (claim 23).

(a) Elmoursi teaches that when performing kinetic spraying the particle size can be 25 to 150 microns. Paragraphs [0009]-[0010] and [0021]. Elmoursi indicates the use of

a traverse speed of 130 mm/sec, and its comparison with other speeds, and that in general thickness decreases traverse speed increases. Paragraph [0045]. The standoff distance is also varied to show different thickness coating results, including a standoff of 44 mm. Paragraph [0046].

(b) Zhao teaches a kinetic spraying device. Paragraph [0006] - [0008]. The particle sizes can be 60 to 110 microns. Paragraph [0023]. Zhao shows deposition efficiency results for different traverse speeds, including 4 and 5 inches/sec (101 and 127 mm/sec, respectively) and desirable speeds. Paragraphs [0038] – [0039]. Zhao also teaches to control the standoff distance to 10 to 80 mm. Paragraph [0029].

(c) Van Steenkiste '000 teaches kinetic spraying with a traverse rate of desirably 30 to 50 feet/min (152-254 mm/sec, respectively). Paragraph [0021]. The particle size can be 63 to 90 microns. Paragraph [0030]. A standoff distance is desirably 10 to 40 mm. Paragraph [0028].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Rayburn in view of Tawfik , Van Steenkiste '386 and Hathaway to optimize the distance between the substrate and nozzle and the traverse speed when performing the process of Rayburn in view of Tawfik and Van Steenkiste '386 and Hathaway as suggested by (a) Elmoursi, (b) Zhao or (c) Van Steenkiste '000, because Van Steenkiste '386 provides spraying features for various sizes of particles and materials and (a) Elmoursi, (b) Zhao or (c) Van Steenkiste '000 teaches that traverse

speed in kinetic spraying can desirably be in the same range and nozzle standoff distance from the substrate can desirably be within the claimed range.

18. Claims 5 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rayburn in view of Tawfik , Van Steenkiste '796 and Hathaway as applied to claims 1-4, 6, 9 and 11 above, and further in view of either (a) Elmoursi et al (US 2003/0219576), (b) Zhao et al (US 2005/0040260) or (c) Van Steenkiste et al (US 2004/0157000) (hereinafter Van Steenkiste '000).

As to rejections using Zhao et al and Van Steenkiste '000 only:The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Rayburn in view of Tawfik , Van Steenkiste '796 and Hathaway teach all the features of these claims except (1) the nozzle stand off distance (claim 5) and (2) the traverse speed (claim 23).

(a) Elmoursi teaches that when performing kinetic spraying the particle size can be 25 to 150 microns. Paragraphs [0009]-[0010] and [0021]. Elmoursi indicates the use of

a traverse speed of 130 mm/sec, and its comparison with other speeds, and that in general thickness decreases traverse speed increases. Paragraph [0045]. The standoff distance is also varied to show different thickness coating results, including a standoff of 44 mm. Paragraph [0046].

(b) Zhao teaches a kinetic spraying device. Paragraph [0006] - [0008]. The particle sizes can be 60 to 110 microns. Paragraph [0023]. Zhao shows deposition efficiency results for different traverse speeds, including 4 and 5 inches/sec (101 and 127 mm/sec, respectively) and desirable speeds. Paragraphs [0038] – [0039]. Zhao also teaches to control the standoff distance to 10 to 80 mm. Paragraph [0029].

(c) Van Steenkiste '000 teaches kinetic spraying with a traverse rate of desirably 30 to 50 feet/min (152-254 mm/sec, respectively). Paragraph [0021]. The particle size can be 63 to 90 microns. Paragraph [0030]. A standoff distance is desirably 10 to 40 mm. Paragraph [0028].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Rayburn in view of Tawfik , Van Steenkiste '796 and Hathaway to optimize the distance between the substrate and nozzle and the traverse speed when performing the process of Rayburn in view of Tawfik and Van Steenkiste '796 and Hathaway as suggested by (a) Elmoursi, (b) Zhao or (c) Van Steenkiste '000, because Van Steenkiste '796 provides spraying features for various sizes of particles and materials and (a) Elmoursi, (b) Zhao or (c) Van Steenkiste '000 teaches that traverse

speed in kinetic spraying can desirably be in the same range and nozzle standoff distance from the substrate can desirably be within the claimed range.

19. Claims 16, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rayburn in view of Tawfik and Van Steenkiste '796 as applied to claims 12-15, 18, 20 and 26 above, and further in view of either (a) Elmoursi et al (US 2003/0219576), (b) Zhao et al (US 2005/0040260) or (c) Van Steenkiste et al (US 2004/0157000) (hereinafter Van Steenkiste '000).

As to rejections using Zhao et al and Van Steenkiste '000 only:The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Rayburn in view of Tawfik and Van Steenkiste '796 teach all the features of these claims except (1) the nozzle stand off distance (claim 16) and (2) the traverse speed (claim 24).

(a) Elmoursi teaches that when performing kinetic spraying the particle size can be 25 to 150 microns. Paragraphs [0009]-[0010] and [0021]. Elmoursi indicates the use of

a traverse speed of 130 mm/sec, and its comparison with other speeds, and that in general thickness decreases traverse speed increases. Paragraph [0045]. The standoff distance is also varied to show different thickness coating results, including a standoff of 44 mm. Paragraph [0046].

(b) Zhao teaches a kinetic spraying device. Paragraph [0006] - [0008]. The particle sizes can be 60 to 110 microns. Paragraph [0023]. Zhao shows deposition efficiency results for different traverse speeds, including 4 and 5 inches/sec (101 and 127 mm/sec, respectively) and desirable speeds. Paragraphs [0038]—[0039]. Zhao also teaches to control the standoff distance to 10 to 80 mm. Paragraph [0029].

(c) Van Steenkiste '000 teaches kinetic spraying with a traverse rate of desirably 30 to 50 feet/min (152-254 mm/sec, respectively). Paragraph [0021]. The particle size can be 63 to 90 microns. Paragraph [0030]. A standoff distance is desirably 10 to 40 mm. Paragraph [0028].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Rayburn in view of Tawfik and Van Steenkiste '796 to optimize the distance between the substrate and nozzle and the traverse speed when performing the process of Rayburn in view of Tawfik and Van Steenkiste '796 as suggested by (a) Elmoursi, (b) Zhao or (c) Van Steenkiste '000, because Van Steenkiste '796 provides spraying features for various sizes of particles and materials and (a) Elmoursi, (b) Zhao or (c) Van Steenkiste '000 teaches that traverse speed in kinetic

spraying can desirably be in the same range and nozzle standoff distance from the substrate can desirably be within the claimed range.

Allowable Subject Matter

20. Claim 27 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The cited prior art does not teach or suggest the use of particles of an average nominal diameter of from 600 to 1400 microns as claimed.

Response to Arguments

21. Applicant's arguments filed February 9, 2006 have been fully considered but they are not persuasive.

Applicant's Arguments

Applicant has provided arguments as to the primary combinations of the Examiner as to claim 1 and its dependent claims. The combinations are (1) combination of Rayburn/Tawfik/Van Steenkiste '386 and Hathaway and (2) the combination of Rayburn/Tawfik/Van Steenkiste '796 and Hathaway.

As to the first and second combination applicant argues that the Examiner has failed to point to any specific teachings, suggestions or motivations within the references themselves to combine the references and modify to make applicant's

invention obvious, as is required. Applicant argues that, instead, the Examiner has taken applicant's invention and used it as a blueprint to find the cited references, using impermissible hindsight. According to applicant the references cannot be properly combined and even when combined do not make the present invention obvious. Applicant then goes on to argue, as to the specific references, that Rayburn teaches using thermal spraying of molten aluminum to embed the aluminum in the plastic coatings, so as to contact the surface of the substrate. Applicant argues that thermal spraying is a fundamentally different process than kinetic coating as thermal spraying is high temperature and kinetic spraying is low temperature, and relies upon acceleration to provide bonding, and thus the teachings of Rayburn are inapplicable to the present invention and are irrelevant and teach away from the present invention. Furthermore, any removal of plastic is due to the high temperature of the molten metal. As to Tawfik, applicant argues that it teaches thermal spraying, and in passing mentions cold gas dynamic spraying, with no details provided. Even if Tawfik provides kinetic spraying when embedding as suggested by the Examiner, this is inapplicable to the present invention, because no particles are being embedded, rather they are removing the plastic type material. As to Van Steenkiste '386/'796, applicant argues that it teaches at most that a metal substrate can be directly coated with metal particles by either kinetic or thermal spray processes and provides no reason to combine with the other references. As to Hathaway, applicant argues that it is also a thermal spray process. Applicant argues that one must also consider knowledge that is

generally available to one of ordinary skill in the art, but one should not use impermissible hindsight when doing so.

As to independent claim 12 and its dependent claims, using the primary combination of Rayburn, Tawfik and Van Steenkiste '796, applicant takes the same position as with regard to claim 1 above, and further notes the use of the large particles. Applicant argues that Van Steenkiste '386 does not apply because it teaches smaller particles.

The Examiner's Response

The Examiner has reviewed these arguments, however, the rejection is maintained. As to the combination of Rayburn, Tawfik, Van Steenkiste and Hathaway, the Examiner notes applicant's arguments as to propriety of combining the references. In response to applicant's argument that there is no suggestion to combine the references found within the references themselves, the Examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). Thus, the reason to combine can be found in knowledge generally available to one of ordinary skill in the art. Furthermore, in response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning,

it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). As to the references themselves, it is the combination of the references that provides the suggestion of the claimed invention. As discussed in the rejection above, Rayburn teaches spray coating a plastic covered metal with metal particles that are embedded in the plastic, to contact with the metal substrate, thus pushing the plastic out of the way, thus "removing" it from the area. While Rayburn teaches thermal spraying of molten metal rather than kinetic spray, Tawfik provides the suggestion that in the art it is known to substitute cold gas dynamic spray (kinetic spraying) for thermal spraying when spraying to embed particles in a substrate to provide the benefit of preventing overheating of the substrate. Thus, while thermal spraying may involve ~~and~~ a different process than kinetic spraying, one of ordinary skill in the art is clearly taught to replace thermal spraying with kinetic spraying, and would be suggested to perform this replacement for known thermal spray processes. While Tawfik teaches a metal substrate, one of ordinary skill in the art would know that plastic would be subject to overheating as well, as plastic commonly has a lower melting/decomposing point than metal, and thus would be suggested to replace thermal spraying of plastic with kinetic spraying, for the same benefits as taught by

Tawfik. As to the argument that particles are not "embedded" in the present application, the Examiner notes that as discussed above, "embedding" provides "removal" within the meaning of the term. While Tawfik does not provide the details of exactly how kinetic spraying occurs, Van Steenkiste '386/'796 has been provided as to just this point. While Van Steenkiste '386/'796 provides coating a metal substrate, the mechanics of the spray process described would not be limited to a metal substrate, as the mechanics are in the spraying conditions to be such that bonding occurs on impact without melting of the particles in flight. Finally, as to the mask of Hathaway, this reference indicates the commonality of using a mask when spraying with metal so that the coating is only applied where desired. Rayburn teaches, for example, the desire to coat the edges of the capacitor, which would indicate the desire to coat a specific area. While Hathaway does not teach kinetic spraying or plastic coated substrate, this suggestion is provided by the other references, such as Tawfik which teaches the advantages of substituting kinetic spray coating for thermal spray coating and Rayburn teaching the plastic coated substrate (note that Hathaway teaches the surface of the substrate can be laminated phenolic or Bakelite - both polymer type materials). Here, improper hindsight reasoning is not used, as the prior art to Tawfik directly teaches replacing thermal spraying with kinetic spraying and the other art is also that of ordinary skill at the time the invention was made.

As to the rejection of claim 12 and its dependent claims, the primary combination of Rayburn, Tawfik and Van Steenkiste '796 is maintained for the reasons given above. As

to applicant's arguments with regard to Van Steenkiste '386, the Examiner notes that Van Steenkiste '386 is not used in the rejection of claim 12 and its dependent claims. Van Steenkiste '796, which is used, teaches a particle size of 250 microns, which thus provides a point in the range of the claimed 250-1400 micron range. One point is all that is need to meet the requirements of the claims.

Conclusion

22. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and for After Final communications.

Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KATHERINE BAREFORD
PRIMARY EXAMINER